TGA curve of Alg and Ugi-Alg analysis as follows:

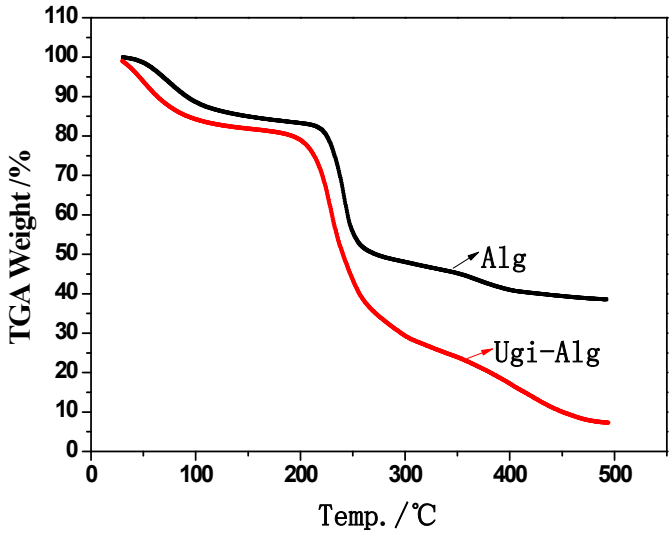


Fig. s1 TGA curve of Alg and Ugi-Alg

The thermal gravity analysis (TGA) for Alg and Ugi-Alg are shown in Fig. s1. As we know, the first stage region belongs to the loss of combined water of NaAlg in the 40–160 °C and in the second stage from 220 to 280 °C, the weight loss of NaAlg should be the carboxyl take off CO_2 and neighboring hydroxyl dehydration. The weight loss of Ugi-Alg is obviously higher than the native alginate because of the thermal scission of the ester and the evolution of dodecyl formate. This finding further supports the presence of ester bond formation between methanol and sodium alginate.[1,2]

[1]. Yan, H.Q., Chen, X.Q., Li, J.C., Feng, Y.H., Shi, Z.F, Wang, X.H., & Lin, Q, Synthesis of alginate derivative via the Ugi reaction and its characterization. *Carbohydrate Polymers*, 2016, **136**, 757-763.

[2]. Yang, J.S., Chen, S.B., & Fang, Y, Viscosity study of interactions between sodium alginate and CTAB in dilute solutions at different pH values. *Carbohydrate Polymers*, 2009, **75**, 333-337.)

4. ^{1}H NMR spectra of Alg and Ugi-Alg analysis as follows:

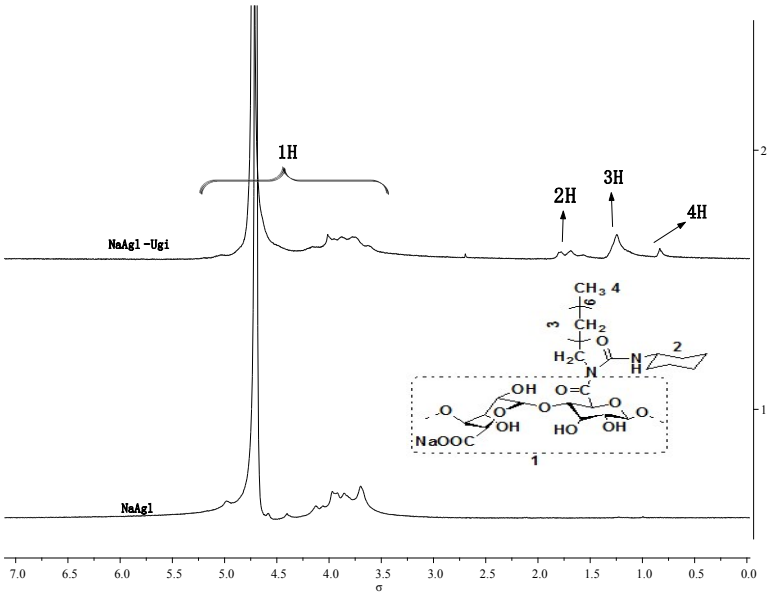


Fig. 4 ^{1}H NMR spectra of Alg and Ugi-Alg

The structure of Alg and Ugi-Alg was shown in Fig.4. Comparing the ^{1}H NMR spectrum of Alg with that of Ugi-Alg, some new proton peaks ranging from 2.0 to 0.5 ppm appear because of the presence of new functional groups linked to alginate. The protons assignment of the new functional groups is listed as follows: δ (ppm): 1.8–1.5 (t, C_6H_{11} of cyclohexyl), 1.1 (t, C_6H_{11} of cyclohexyl), 1.2(s, $(CH_2)6$ of octyl), 0.8 (s, CH_3 of octyl). According to these results, a conclusion can be drawn that Ugi-Alg was successfully synthesized. (1. K. Cho, X. Wang, Z. Chen, D. Shin, Clin. An actin-Binding Protein Girdin Regulates the Motility of Breast Cancer Cells, Cancer Research. 14 (2008) 1310–1316. 2. Yan, H.Q., Chen, X.Q., Li, J.C., Feng, Y.H., Shi, Z.F, Wang, X.H., & Lin, Q, Synthesis of alginate derivative via the Ugi reaction and its characterization. Carbohydrate Polymers, 136(2016), 757-763.)

Reviewer #3

We appreciate Reviewer #3 for constructive and insightful criticism and advice. Reviewer #3 suggested us to clear the novelty of the manuscript and compare these results with relevant studies. They have been rephrased. And we addressed all the points raised by the reviewer as summarized below.

1. Thank you very much for your careful review. Refer to the literature, we found that Yang et al.

reported that octyl-grafted amphiphilic alginate-amide derivative(OAAD) was use in encapsulation of λ-cyhalothrin (LCH). The results showed that the maximum encapsulation efficiency of LCH is 96.40%, which is similar to our results. (Yang, J.S.; Ren, H.B.; Xie, Y.J., Synthesis of amidic alginate derivatives and their application in microencapsulation of lambda-cyhalothrin. Biomacromolecules 2011, 12(8), 2982-7.) Secondly, novelty of the reported systems is environmental responses (pH and Na^+ ion) of micelles. Because more than 90% of the applied conventional pesticides are either lost in the environment or never reach the target area required for pest control at the precise time and in precise quantities required, due to nonspecific and periodic application of active agents. The responsive polymer micelles have significant potential to improve the performance of pesticides by increasing their efficacy and safety and making them environmentally less harmful. (1. Cao, L.D.; Zhang, H.R.; Cao, C.; Zhang, J.K.; Li, F.M.; Huang. Q.L. Release Nanomaterials 2016, 6, 126. 2. Ye, Z.; Guo, J.J.; Wu, D.W.; Tan, M.Y.; Xiong, X.; Yin, Y.H.; He, G.H. Polymers 2015, 132, 520–528. 3. Sun, C.; Shu, K.; Wang, W.; Ye, Z.; Liu, T.; Gao, Y. Journal of Pharmaceutics 2014, 463, 108–114. 4.Tasmin, R.; Shimasaki, Y.; Tsuyama, M.; Qiu, X.; Khalil, F.; Okino, N. Pseudokirchneriella subcapitata Environmental Science and Pollution Research 2014, 21,1064-1070.)

2. Thank you very much for your careful review. Release study of acetamiprid-loading micelles showed that with the decreasing pH from 5.3 to 2.0, the cumulative release and release rate of acetamiprid decreased. The results indicated that acetamiprid-loading micelles still keep pH-responsiveness.

3. Thank you very much for your careful review and propose. Refer to the literature, we found that Pawar et al. reported that the affinity of alginates towards divalent ions decreases in the following order: Pb > Cu > Cd > Ba > Sr > Ca >Co, Ni, Zn > Mn. Ca^{2+}, however, is the most commonly used cation to induce alginate gel formation. The results showed that different ions have significantly effect on the cross-linking and swelling of alginate, which is the focus of designing consideration in the further research. (Pawar, S. N.; Edgar, K. J., Alginate derivatization: a review of chemistry, properties and applications. Biomaterials 2012, 33, (11), 3279-305.).

4. The size of micelles increased after the loading, but is not obvious. The results were shown in Fig. 5.

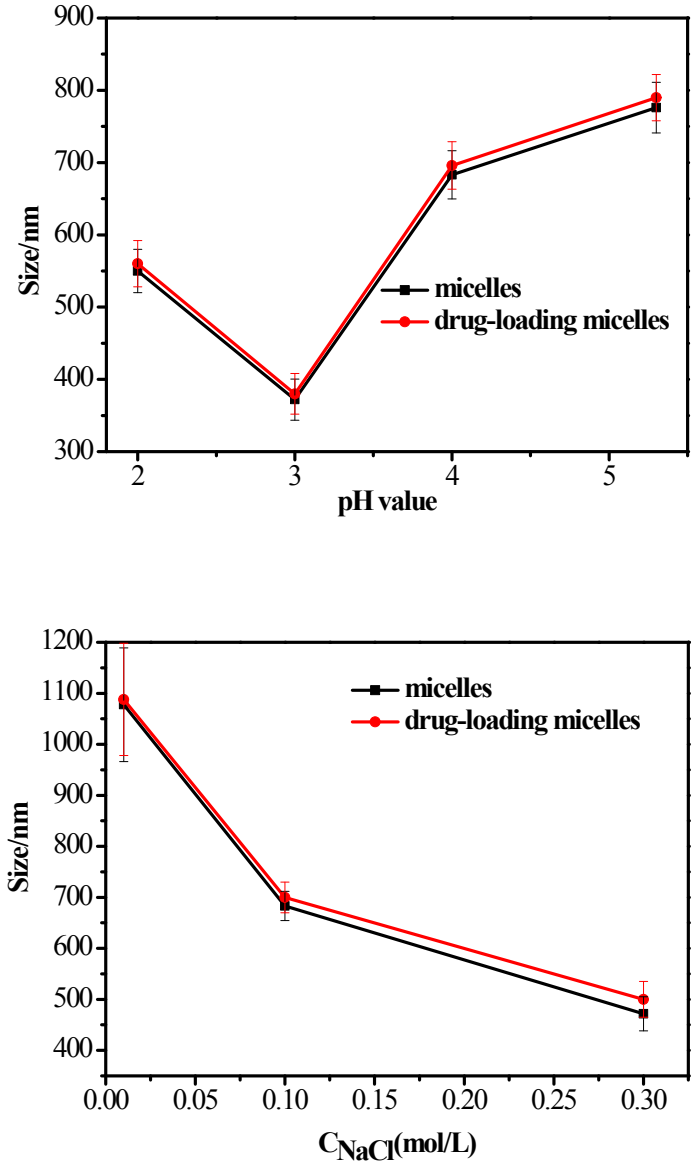


Fig. 5. Effect of encapsulation efficiency on the z-average diameters of micelles.

4. Overall, comparing relevant studies of Yang et al., the size of our micelles not only smaller but maximum drug loading rate is same. (1. Yang, J. S.; Zhou, Q. Q.; He, W., Amphipathicity and self-assembly behavior of amphiphilic alginate esters. Carbohydrate polymers 2013, 92, (1), 223-7. 2.Yang, J. S.; Ren, H. B.; Xie, Y. J., Synthesis of amidic alginate derivatives and their application in microencapsulation of lambda-cyhalothrin. Biomacromolecules 2011, 12(8), 2982-7.) Comparing relevant studies of Sundhoro et al., our micelles have a good biocompatibility and

biodegradable. (Sundhoro, M.; Park, J.; Jayawardana, K. W.; Chen, X.; Jayawardena, H. S. N.; Yan, M., Poly(HEMA-co-HEMA-PFPA): Synthesis and preparation of stable micelles encapsulating imaging nanoparticles. Journal of colloid and interface science 2017, 500, 1-8.). Comparing relevant studies of Wang et al., our micelles have a good pH and Na^+ ion response. (Wang, X.; He, C.; Yang, Q.; Tan, L.; Liu, B.; Zhu, Z.; Gong, B.; Shen, Y.-M., Dynamic covalent linked triblock copolymer micelles for glutathione-mediated intracellular drug delivery. Materials Science and Engineering: C 2017, 77, 34-44.)

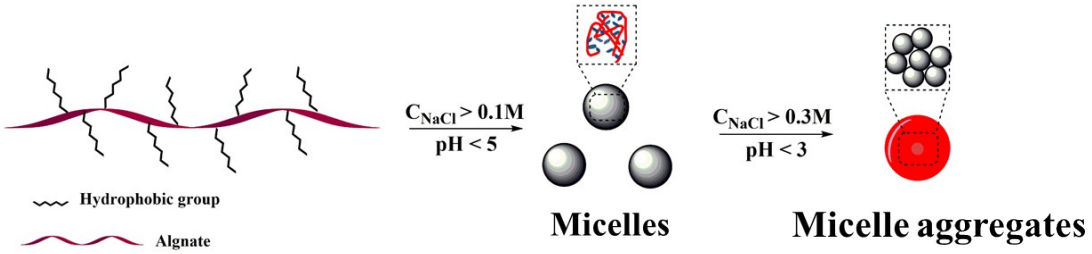
Reviewer #4

We appreciate Reviewer #4 for constructive and insightful criticism and advice. Reviewer #4 He must read it thoroughly and give us many proposals which are not easy to be found, such as spelling, format and formula errors. We addressed all the points raised by the reviewer, as summarized below.

1. This paper has been edited for language by Enpapers that is a company dedicated to helping international researchers publish their findings in the best English language journals possible. The grammatical mistakes, wrong sentence structures, and wrong word usage have been corrected.

2. Thank you very much for your careful review. Explanation of the results from Figure 2 in page 11 as follow: The zeta potential shown in Figure 2(a) illustrated that the negative charged of the micelles surface decreased as Na^+ concentration increased.

3. Thank you very much for your careful review. We have been used " the Ugi-Alg chains are curled" instead of " the micelles are curled". And “resulting in aggregation between micelle and micelle” instead of “micelles aggregation”. A simple diagram as follow:



4. Thank you very much for your careful review and good propose. Firstly, as is shown in Fig 5(a), with the decreasing pH from 5.3 to 2.0 or increasing Na^+ concentration from 0.01 to 0.30 M, the cumulative release and release rate of acetamiprid decreased. Especially, effective release time of pH=2.0 micelles extended to 500 min (about 8h). The results are similar to that reported at Colloids and Surfaces B. (1. Yu, L,; Lin, C.Y.; Zheng, Z.; Li, Z.; Wang, X.L.; Self-assembly of pH-responsive biodegradable mixed micelles based on anionic and cationic polycarbonates for doxorubicin delivery. Colloids and Surfaces B: Biointerfaces. 2016, 145, 392–400). Secondly, in the further research, high mechanical strength micelles were obtained by using physical (Ca^{2+}) or chemical cross-linking method, in order to increase effective release time of drug-loading micelles. which is the focus of designing consideration in our further research. (1. Yang, J. S.; Ren, H. B.; Xie, Y. J., Synthesis of amidic alginate derivatives and their application in microencapsulation of lambda-cyhalothrin. Biomacromolecules 2011, 12, (8), 2982-7.)

5. Thank you very much for your careful review and good propose. All citations have been corrected in accordance with Journal requirements.

Sincerely yours

Jiacheng Li and Kai Chen