

## Synthesis and Properties of Mixed Chitin Esters

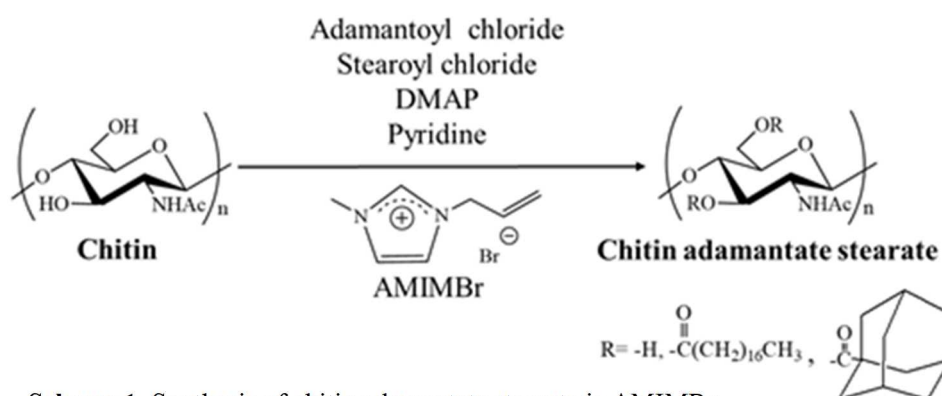
|                              |   |
|------------------------------|---|
| 著者                           | HIRAYAMA Hiroki, YAMAMOTO Kazuya, KADOKAWA Jun-ichi                                     |
| journal or publication title | The Research Reports of the Faculty of Engineering, Kagoshima University                |
| volume                       | 62  |
| page range                   | 13-13   |
| year                         | 2020  |
| URL                          | <a href="http://hdl.handle.net/10232/00031536">http://hdl.handle.net/10232/00031536</a> |

## Synthesis and Properties of Mixed Chitin Esters

Hiroki Hirayama<sup>1</sup>, Kazuya Yamamoto<sup>1</sup>, Jun-ichi Kadokawa<sup>1</sup>

### Abstract

Chitin is a natural polysaccharide abundantly present in nature, and thus, very important biomass resource. However, since chitin has strong crystallinity by intermolecular hydrogen bonding between acetamido groups, it is poor in solubility and processability, leading to mostly unutilization. We have already found that 1-allyl-3-methylimidazolium bromide (AMIMBr) dissolves chitin at most in 4.8 wt %. We also found that chitin acylates with high degrees of substitution (DSs) were obtained by acylation of chitin using acyl chlorides in AMIMBr [1]. However, processability of the products was not improved probably due to the remaining hydrogen bonds between acetamido groups. In this study, we synthesized mixed chitin ester having adamantoyl and stearyl groups in AMIMBr, in which the hydrogen bond would be weakened by introducing bulky and long chain alkyl groups on the chitin chain (**Scheme1**). The IR and <sup>1</sup>H NMR spectra of the product indicated that chitin adamantate stearate with high DS was obtained. In the XRD profile, the diffraction peaks assignable to chitin crystalline structure greatly decreased, and a diffraction peak ascribed to end-to-end packing of stearyl groups was shown in  $2\theta = 3.0^\circ$ . The DSC pattern showed an endothermic peak due to enthalpy relaxation of the packing structure at 7 °C. These results suggested that the chitin crystalline structure was disrupted, while the side chain was crystallized. As the product was dissolved in chloroform, the solution could be thinly casted to obtain a flexible film



**Scheme 1.** Synthesis of chitin adamantate stearate in AMIMBr

### Reference

1) H. Hirayama, J. Yoshida, K. Yamamoto, J. Kadokawa, *Carbohydr. Polym.*, **200**, 567 (2018).

<sup>1</sup> Department of Chemistry, Biotechnology, and Chemical Engineering, Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan