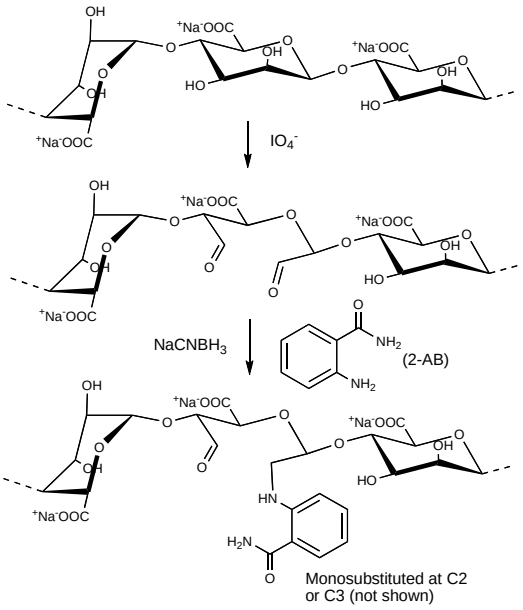
POLYSACCHARIDES WITH REACTIVE CARBONYLS: CHEMICAL AND PHYSICAL PROPERTIES

Bjørn E. Christensen,[a]* and Kåre A. Kristiansen[a]

[(a)] NOBIPOL, Department of Biotechnology, Norwegian University of Science and Technology (NTNU), NO-7491 Trondheim, Norway * b.christensen@biotech.ntnu.no

Polysaccharides may contain reactive keto- or aldehydo groups, mostly attributed to oxidative side reactions during processing, and in some cases arising from specific chemical or enzymatic reactions designed for the purpose of oxidation, for instance periodate. In addition to chemical reactivity, the introduction of carbonyl groups directly or indirectly influence the physical properties, for instance chain flexibility.[1,2]

The carbonyl profiles of a pectin ('sphagnan')[3] from *Sphagnum* moss and some periodate oxidized polysaccharides were assayed by fluorescent labeling or reduction with tritiated borohydride, in combination with multidetector SEC. The tritium incorporation method was preferred for alkali stable polysaccharides, while the CCOA method was most suitable for acid stable polysaccharides with low carbonyl content. The 2-AB method is applicable for all polysaccharides tested with varying carbonyl content; however it lacks the ability to detect ketone functionalities[4]. Interestingly, periodate oxidized alginate reacted only with one molecule of 2-AB per dialdehyde. Sphagnan displayed a special carbonyl profile, with the highest carbonyl content at high molecular weights.



Recently, periodate oxidation was combined with in vitro epimerization of mannuronan – a special alginate obtained from an epimerase-negative strain of *Pseudomonas*. In this way, novel alginates were obtained[5]. Some of their chemical and gelling properties will be discussed.

[1]Vold, I.M.N., Kristiansen, K.A., Christensen, B.E. *Biomacromolecules*, **2006**, 7, 2136-2146.
[2]Christensen, B.E., Vold, I.M.N., Vårum, K.M. *Carbohydr. Polym*. **2008**, 74, 559-565.
[3]Ballance, S., Børsheim, K.Y., Inngjerdingen, K., Paulsen, B.S., Christensen, B.E. *Carbohydr. Polym*. **2007**, 67, 104-115.
[4]Kristiansen, K.A., Ballance, S., Potthast, A., Christensen, B.E. *Carbohydr. Polym*. **2009**, In press (Accepted 8 Oct 2008).
[5] Kristiansen, K.A., Schirmer, B.C. Aachmann, F.L., Skjåk-Bræk, G., Draget, K.I., Christensen, B.E. Unpublished results.