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Title:

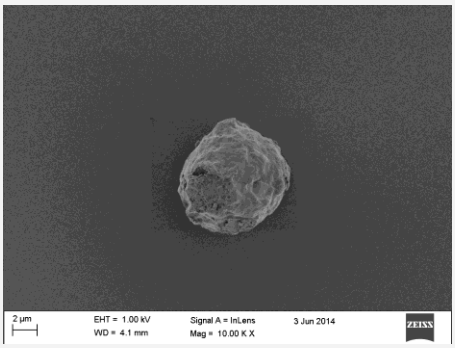
Sulfonated *Cladophora* cellulose beads as a material for biomedical applications

Authors & affiliations:

Igor Rocha, Natalia Ferraz, Albert Mihranyan, Maria Strømme, Jonas Lindh

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

In this work we present a novel material consisting of chemically modified *Cladophora* cellulose beads where sulfonate groups were introduced. The aim is to obtain a support for blood plasmapheresis with improved anticoagulant properties.
Nanocellulose from *Cladophora* green algae, a pollutant found in great quantities at e.g. the Baltic Sea, was used as the starting material. This nanocellulose is characterized as containing high degree of crystallinity, large surface area and broad chemical modifying capacity.
2,3-dialdehyde cellulose (DAC) beads were produced via a simple one-pot procedure involving periodate oxidation in aqueous medium. (ref Lindh 2014) The DAC beads size ranged from 1-20 µm according to SEM micrographs. IR spectroscopy showed the selective conversion of 2,3-OH groups into dialdehyde groups and elemental analysis was used to assess the degree of oxidation. Sulfonation of the DAC beads was achieved via a reaction between the aldehyde groups of never-dried DAC beads and sodium bisulfite and its degree of sulfonation was evaluated by condutometric titration, elemental analysis and zeta potential measurements. (ref Zhang, Ragauskas 2008) It was observed that the morphology of the beads was maintained also after sulfonation and purification of the material.
A more detailed study of its chemical composition with Raman spectroscopy as well as surface area measurements with nitrogen adsorption analysis was performed for a better understanding of the physicochemical properties of the sulfonated nanocellulose beads.
As the sulfonated beads are intended to be used in contact with blood, *in vitro* toxicity studies with the monocyte cell line THP-1 were performed and the purification steps after synthesis were adjusted to obtain a non-toxic material.



Lindh J, Carlsson DO, Strømme M, Mihranyan A (2014) Biomacromolecules 15(5):1928-32.

Zhang J, Jiang N, Dang Z, Elder TJ, Ragauskas AJ (2008) Cellulose 15:489–496.