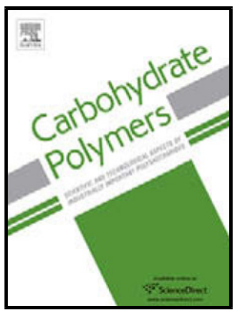


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# Preparation of carrageenan fibers with extraction of *chondrus* via wet spinning process

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## Highlights

- The extraction obtained from chondrus was converted into spinning solution directly.
- Carrageenan fibers prepared from extraction directly showed high strength.
- The steps involved in preparation and dissolution of the powder were omitted.
- The technology could simplify the process and reduce the losses of water and energy.

## Abstract

Traditionally, the carrageenan fibers were prepared by process of extracting, drying, dissolving of carrageenan power and wet spinning process of fibers. However, in this study, carrageenan fibers were prepared by carrageenan solution directly from the extraction of *chondrus*, without the steps of precipitation, and drying. The properties of carrageenan powder, spinning solution and carrageenan fibers were characterized with zeta potential, NMR, FTIR, dynamic light scattering (DLS), SEM, tensile testing and energy dispersive spectrometer (EDS). The results showed that the *chondrus* contained mainly iota-carrageenan. The extraction of *chondrus* was a uniform liquid with good properties of a solution, which was suitable as a spinning solution. The so prepared carrageenan fibers possessed good morphology and tensile properties. The excellent tensile properties of the carrageenan fibers were attributed to the combination of sulfate ester in the carrageenan and barium ions in the coagulation and then form a three-dimensional network structure.

**Keywords:** *Chondrus*; Extraction; Wet spinning; Carrageenan fibers.

## 1. Introduction

Carrageenan is composed of sulfated or non-sulfated galactose and 3,6-dehydrodylated lactone galactose by alternate linking of the α-1,3-glycosidic bonds with the β-1,4 glycosidic bonds (Torres, Chenlo, & Moreira, 2018; Zhu et al., 2017) and is sulfated polysaccharides molecular of line extracted from various species of red