



## Comparative Study of Extraction of Cellulose Nanocrystals (CNC) from Wood Pulp

Lilia BENCHIKH<sup>1</sup>, Abdelhafid MERZOUKI<sup>1</sup>

<sup>1</sup> *Laboratoire de Physico-Chimie des Hauts Polymères, Département de Génie des Procédés, Faculté de Technologie, Université Ferhat Abbas Sétif 1, Algérie*

**Abstract.** The present work is a study on cellulose nanocrystals extracted from the wood Pulp of the joineries in order to exploit this cellulosic waste (recycling). After a bibliographic study, we selected four different extraction technics to be followed. The extracts obtained have undergone several physical and structural characterizations to evaluate the influence of the extraction method on the yield in quality and quantity of the CNCs.

Fourier transform infrared spectroscopy (FT-IR) was used to highlight the evolution of the chemical composition thus confirming the elimination of extracellular substances during the chemical treatment of the extraction process. X-ray diffraction analysis determined the crystallinity of the CNC. According to the results of the thermogravimetric analyzes, the degradation of the CNCs occurs at a low temperature in the region of 200 ° C. The morphology of cellulose nanocrystals has been studied by optical microscopy.

**Keywords:** biopolymer, biomass, cellulose, cellulose nanocrystals, whiskers.

### 1 Introduction

Synthetic polymer materials are in permanent development, but the challenge for scientists today is the development of new materials that will satisfy our needs and at the same time be compatible with the environment and renewable sources. This has led to much research on biopolymers and composites in the last two decades and we are witnessing a rapid development of nanocomposite polymers which are polymer matrices reinforced by a filler that has at least one dimension less than 100 nm [1].

Natural fiber-reinforced composites have attracted the attention of the research community mainly because they are turning out to be an alternative solution to the ever-depleting petroleum sources [2].

Among the various organic nano particles, cellulose nano particles have encountered an enormous consideration for diverse causes. Nevertheless, cellulose has several substantial

\* Corresponding author. Lilia BENCHIKH  
E-mail address: [lilia.benchikh@gmail.com](mailto:lilia.benchikh@gmail.com)