

Accepted Manuscript

Novel composite films based on cellulose reinforced with chitosan and polyvinyl alcohol: Effect on mechanical properties and water vapour permeability

Patricia Cazón, Manuel Vázquez, Gonzalo Velazquez

PII: S0142-9418(18)30470-7

DOI: [10.1016/j.polymertesting.2018.06.016](https://doi.org/10.1016/j.polymertesting.2018.06.016)

Reference: POTE 5513

To appear in: *Polymer Testing*

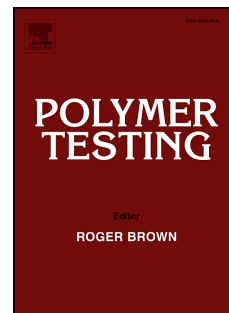
Received Date: 22 March 2018

Revised Date: 30 April 2018

Accepted Date: 9 June 2018

Please cite this article as: P. Cazón, M. Vázquez, G. Velazquez, Novel composite films based on cellulose reinforced with chitosan and polyvinyl alcohol: Effect on mechanical properties and water vapour permeability, *Polymer Testing* (2018), doi: 10.1016/j.polymertesting.2018.06.016.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 **Novel composite films based on cellulose reinforced with chitosan and polyvinyl**
2 **alcohol: effect on mechanical properties and water vapour permeability**

3

4 Patricia Cazón^{1,2}, Manuel Vázquez^{2*}, Gonzalo Velazquez¹

5

6 ¹Instituto Politécnico Nacional. CICATA unidad Querétaro. Cerro Blanco No. 141.

7 Colinas del Cimatarío, Querétaro, 76090, México.

8 ²Department of Analytical Chemistry, Faculty of Veterinary, University of Santiago de

9 Compostela, 27002-Lugo, Spain

10 *Corresponding author: manuel.vazquez@usc.es

11

12 **ABSTRACT**

13 Novel composite films were prepared by dissolving microcrystalline cellulose (3-5%
14 w/w) in NaOH/urea solution, followed by coagulation in acetic acid solution. The
15 regenerated cellulose films were immersed in chitosan-polyvinyl alcohol solutions at
16 concentrations of 0-1% w/w and 0-4% w/w, respectively. Tensile strength, percentage
17 of elongation at break, Young's modulus and water vapour permeability were measured
18 to assess the effect of each compound on the mechanical and barrier properties.
19 Polynomial models were obtained to evaluate the effect of the formulation on the
20 measured properties. The microstructure was analysed by scanning electron
21 microscopy. Results showed tensile strength values in the range 27.75-78.48 MPa,
22 similar to usual synthetic polymer films. Percentage of elongation at break ranged from
23 0.98 to 12.82 %, increasing when polyvinyl alcohol and chitosan increased. Young's
24 modulus ranged from 2727.04 to 4217.25 MPa, showing values higher than pure
25 chitosan and polyvinyl alcohol films. The highest value was reached combining

Download English Version:

<https://daneshyari.com/en/article/7824892>

Download Persian Version:

<https://daneshyari.com/article/7824892>

[Daneshyari.com](https://daneshyari.com)