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## Production of bioplastic from nanocellulose and nanochitosan

### AUTHORS

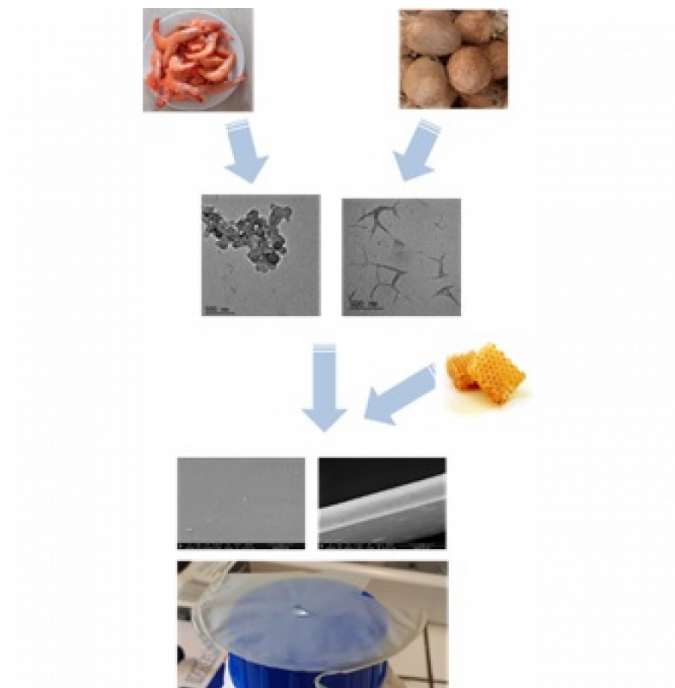
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### PURPOSE OF THE ABSTRACT

Bionanocomposites prepared from natural polymers (proteins, polysaccharides, ...) are materials that are of growing interest in many applications. They combine both the properties of biopolymers (biodegradability, biocompatibility and mechanical properties in some cases) and the additional properties brought by the use of some of these polymers at the nanometric scale.

We will present here the use of biopolymer nanoparticles for the preparation of bioplastic films from biomass derivatives. The bionanocomposites were prepared from both bacterial cellulose obtained from coconut milk and chitin obtained from crustacean shells. More eco-friendly processes were developed for the preparation of nanocellulose from bacterial cellulose as well as for the deacetylation of chitin to chitosan. The synthesis of the nanoparticle from the biopolymers has been developed and the preparation of plastic films from these products was evaluated. The influence of the use of cellulose and chitosan in nanoparticulate form (or not) was evaluated both on the structure of the films and on their properties. Finally, the addition of beeswax to the formulation allowed to obtain films with an increased water resistance.

## FIGURES



**FIGURE 1**

Preparation of bionanocomposite bioplastic are prepared from nanocellulose and nanochitosan

**FIGURE 2**

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## KEYWORDS

nanocellulose | nanochitosan | composite | edible coating

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## BIBLIOGRAPHY

- 1) E. Y. Wardhono, H. Wahyudi, S. Agustina, F. Oudet, M. P. Pinem, D. Clausse, K. Saleh, E Guénin, *Nanomaterials*, 2018, 8, 859. .
- 2) E. Y. Wardhono, M. Permana Pinem, S. Agustina, I. Kustiningsih, F. Oudet, C. Lefebvre, D. Clausse, K. Saleh and E. Guénin, *Nanomaterials*, 2019, 9, 1707.
- 3) M. P. Pinem, E. Y. Wardhono, F. Nadaud, D. Clausse, K. Saleh, E. Guénin, *Nanomaterials*, 2020, 10, 660.
- 4) E. Y. Wardhono, M. P. Pinem, I. Kustiningsih, M. Effendy, D. Clausse, K. Saleh, E. Guénin. *Carbohydr. Polym* 2021, 267,118180.