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## Cellulose and chitin composite materials from an ionic liquid and a green co-solvent

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### Highlights:

- Cellulose/chitin composite materials were prepared from a binary solution comprising the ionic liquid 1-butyl-3-methylimidazolium acetate (BmimOAc) as main solvent and the biosourced and sustainable chemical  $\gamma$ -valerolactone (GVL) as a biosourced sustainable co-solvent
- Chitin was not deacetylated into chitosan during the dissolution process
- The degree of crystallinity and the crystallite size of the cellulose/chitin composite materials were depended on the chitin concentration.
- The composite gel containing 80 wt% chitin showed optimum mechanical properties.

### Abstract:

We report on a method for the preparation of cellulose/chitin composite materials from the ionic liquid 1-butyl-3-methylimidazolium acetate and  $\gamma$ -valerolactone as a biosourced sustainable co-solvent. Element analysis and attenuated total reflectance Fourier transform infrared spectroscopy show that the average degree of acetylation of chitin in the composite materials was around 82.5%. This indicates that chitin is not deacetylated to chitosan during the dissolution process. The X-ray diffraction results show that the degree of crystallinity of the composite materials increases from amorphous to 59% with increasing chitin concentration

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