Antiviral Properties of Flame Retardant Bacterial Nanocellulose Modified with Mordenite

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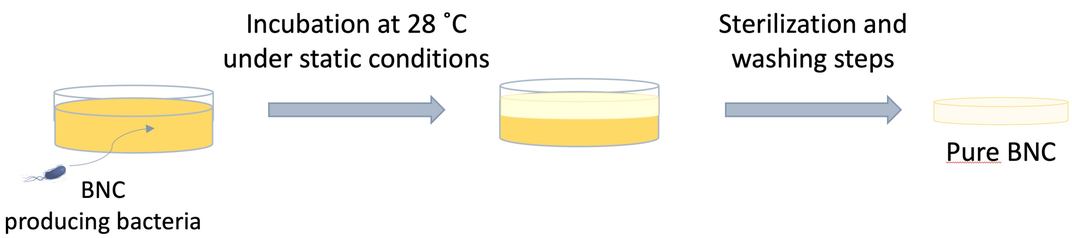
Introduction

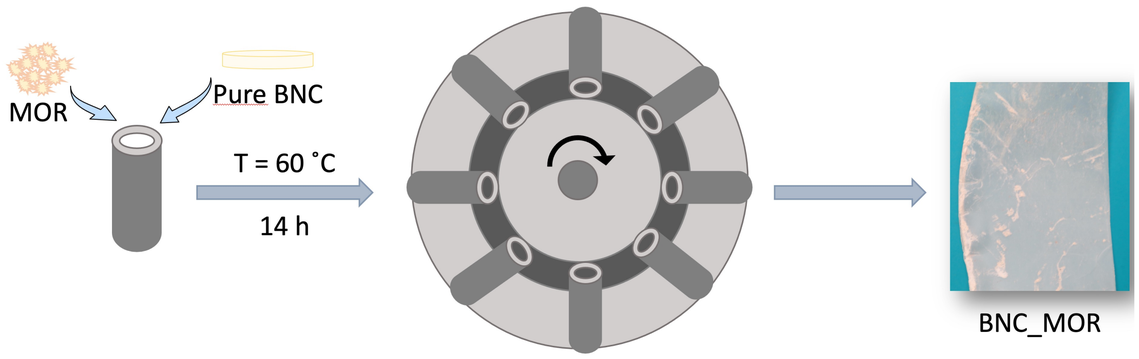
Bacterial nanocellulose (BNC) is a 100 % cellulose nano-nonwoven textile synthesized by bacteria, comprising impressive mechanical properties. Cellulosic materials require flame retardant finishing, thus to reduce flammability of BNC a zeolite mordenite (MOR) was incorporated in its nano structure, without any additives.

Methodology

BNC processing



Exhaustion method

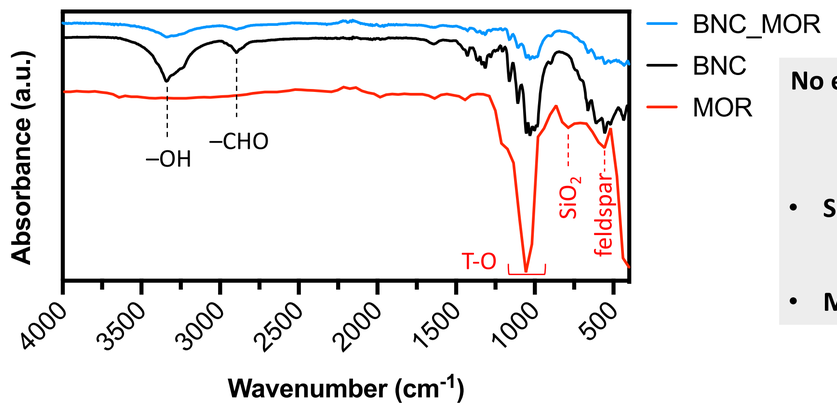


Flame Retardancy Properties

BNC	BNC_MOR
3.6 seconds	Did not burn

Standard 16 CFR Part 1610

Morphological Characterization

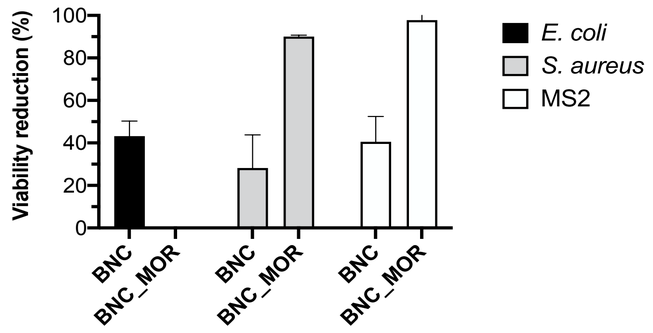


No evidence of characteristic MOR peaks, probably due to:

- **Smaller concentration than BNC**
- **Masking by the BNC band**

Antimicrobial Activity

98 % Antiviral activity



Conclusion

- Excellent improvement of flame retardancy properties of BNC;
- Nearly 99 % of antiviral activity against an encapsulated virus;
- A multifunctional nanomaterial was obtained in a single step using a sustainable approach;
- BNC_MOR may be used in: hospital, transport industry and military textiles applications.

Acknowledgements

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