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## Microbial cellulose biosynthesis/carbon sources: An inverse gas chromatography study

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In the face of the outstanding properties presented by microbial cellulose (MC), for specific applications it is necessary to modify its surface properties. The present study reports a simple method for the surface properties modification, by the alteration of the carbon sources in the MC biosynthesis process. Different MC biosynthesis conditions allows to obtain films with different properties. Date syrup, mannitol, sucrose and food-grade sucrose were the four carbon sources added in the MC biosynthesis besides conventional source - glucose. The assessment of the changes and influence of these carbon sources in the surface properties of MC were investigated through IGC. The date syrup sources give rise to MC with smaller surface areas ( $= 4.04 \text{ m}^2/\text{g}$ ), turns the microporous MC membrane more hydrophobic ( $= 45.79 \text{ mJ}/\text{m}^2$ ) and with more polar and basic character. By other hand, sucrose food-grade presented smaller BC production yield (37% less) and the obtained BC presented more reticulation and crystalline structures (76.2 to 82.3%) with higher ratios and a surface more dependent to the temperature. So, the use of alternative sources of carbon for the MC production is viable, increasing the yield and can be used to modify the BC surface properties in order to achieve desire specific/field applications.

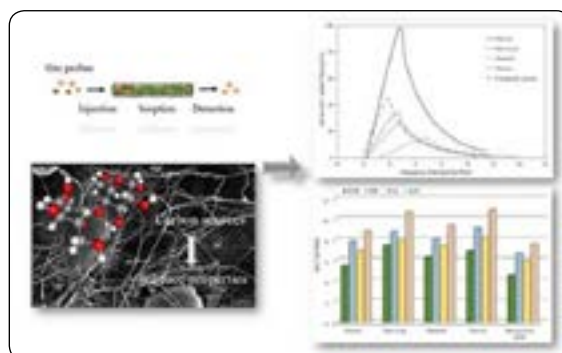


Figure 1: Design of the SLS machine (described in the text): a-general view, b-longitudinal section (axonometry), c-cross-section (axonometry)

### Recent Publications:

1. Urbina, L., Hernández-Arriaga A. M., Eceiza, A., Gabilondo, N., Corcuera, M.A., Prieto, M. A., Retegi, A. (2017) By-products of the cider production: an alternative source of nutrients to produce bacterial cellulose. *Cellulose*, 24, 2071–2082.
2. Tsouko, E. et al (2015) Bacterial Cellulose Production from Industrial Waste and by-Product Streams. *International Journal of Molecular Sciences*, 16, 14832-14849.
3. Mohammadkazemi, F., Azin, Mehrdad, M. & Ashori, A. (2015) Production of bacterial cellulose using different carbon sources and culture media. *Carbohydrate Polymers*, 117, 518–523.
4. Krystynowicz, A., Czaja, W., Wiktorowska-Jezierska, A., Gonçalves- Miśkiewicz, M. & Bielecki, S. (2002) Factors affecting the yield and properties of bacterial cellulose. *Journal of Industrial Microbiology & Biotechnology*, 189-195.

### Biography

Nereida Cordeiro is an Associated Professor of Chemistry in the Faculty of Sciences and Engineering of the University of Madeira. She holds a degree in Analytical Chemistry (University of Aveiro) and PhD in Chemistry (University of Aveiro). Her main research interests are in Analytical and Environmental Chemistry, with focus on biomaterials and biotechnology. She authored more than 70 scientific publications in international journals.

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