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Mango waste as a culture medium for bacterial cellulose production by *Komagateibacter xylinus* in static culture

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Statement of the Problem: Bacterial cellulose (BC) is a high added-value biopolymer with important biomedical and pharmaceutical applications. Its production cost from conventional culture media is high therefore the use of agro-wastes to cultivate cellulose producing bacteria is very important. Mexico is among the top five mango producing countries, but around 30% of the fruit is wasted. Thus, such waste is highly available, contains significant amounts of sugars, and could be used as a fermentation feedstock. It is known that variations in culture medium composition could affect the amount and properties of the synthesized BC. The objective of this research was to characterize the BC produced from a mango waste-based medium (MWB) and compare it to the synthesized in a conventional medium (Hestrin-Schramm).

Methodology & Theoretical Orientation: *K. xylinus* was cultivated in MWB medium formulated with mango pulp waste (total sugars initial concentration: 50g/L) supplemented with yeast extract (5g/L), in static culture (12 days, 30°C). Conventional HS medium was used as a control. BC membranes produced by the bacteria were purified, dried, and characterized: FTIR, XRD, TGA, SEM, and water holding capacity (WHC).

Findings: BC produced in MWB medium presented a similar FTIR spectrum, morphological characteristics, thermogravimetric curves (degradation, 420°C), and WHC (108.6g·water/g·dry BC) than the BC produced conventionally. On the other hand, BC obtained in HS medium presented higher crystallinity that in MWB medium (77.2 vs 62.7%).

Conclusion & Significance: BC synthesized from MWB medium has similar physical and morphological characteristics that BC produced conventionally; the use of mango pulp waste for media formulation is technically feasible and could have and positive impact in the biopolymer production cost. Valorization of agricultural wastes through biotechnological processes is an important research area for producing high-added value products and could also be a way to minimize environmental pollution problems associated with wastes disposal.

Biography

Yolanda Gonzalez-Garcia holds a PhD degree in Biotechnological processes and has her expertise in bacterial biopolymers such as polyhydroxyalkanoates, exopolymeric substances, and bacterial cellulose. She is a titular researcher at the Department of Wood, Cellulose, and Paper of the University of the University Guadalajara (Mexico).

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