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Effect of biosurfactants obtained from different sources on pathogenic microorganisms

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Statement of the Problem: Biosurfactants are amphiphilic compounds with surface properties produced by microorganisms or obtained from biological cells. They have not only the same applications than their synthetic counterparts but also better characteristics in terms of biocompatibility and biodegradation. Although they have been proved in different areas such as bioremediation, their uses are increasing in food and cosmetic formulations. In these areas, microbiology properties are one of the most important parameter to control, so it is necessary to evaluate biosurfactants behavior in presence of microorganisms.

Methodology: Two biosurfactant extracts were produced following the methodologies established by Vecino et al. one obtained from corn steep liquor (CSL) and the other from *Lactobacillus pentosus*. Both biosurfactants were diluted up to 1 g/L of and put in contact with a known concentration of pathogenic microorganisms including *Candida albicans, Aspergillus brasiliensis* and *Pseudomonas aeruginosa*, at 22.5ºC. The effect of these biosurfactants on the microorganism growth was evaluated each 7 days during a month. The culture conditions for obtaining the inoculum of each microorganism were reflected.

Findings: The experiment carried out with biosurfactant from CSL, showed antimicrobial activity against *P. aeruginosa and A. brasiliensis*, thus the concentration of microorganisms was reduced from $2*10^6$ and $2*10^4$ UFC/mL, to 1 and $4*10^3$ UFC/mL, respectively. In the case of *C. albicans*, the amount of colonies slightly increased from $2*10^4$ to $8*10^4$ UFC/mL. For the biosurfactant from *L. pentosus*, the behavior observed was completely different, thus the number of colonies did not change significantly in any of the pathogens tested.

Conclusion & Significance: These results have demonstrated interesting effects of biosurfactant extract from CSL against pathogenic microorganisms, what is in concordance to its antioxidant properties. Furthermore, the biosurfactant from *L. pentosus* showed lower antimicrobial activity.

Microorganism	Culture Medium	Temperature (°C)	Time (Day)
Pseudomona aeruginosa	Tryptic Soy Agar	32.5	2
Candida albicans	Sabouraud Dextrose Agar	32.5	2
Aspergillus brasiliensis	Potato Dextrose Agar	22.5	5

Recent Publications

1. Irorere V U, Tripathi L, Marchant R, McClean S and Banat I M (2017) Microbial rhamnolipid production: A critical re-evaluation of published data and suggested future publication criteria. Applied Microbiology and Biotechnology 101(10):3941-3951.

2. Santos D K F, Ruffino R D, Luna J M, Santos V A and Sarubbo L A (2016) Biosurfactants: Multifunctional biomolecules of the 21st century. International Journal of Molecular Sciences 17(3):401-432.
3. Luna J M, Filho A S S, Rufino R D and Sarubbo L A (2016) Production of biosurfactant from Candida bombicola URM 3718 for environmental applications. Chemical Engineering Transactions 49:583-588.
4. Vecino X, Barbosa-Pereira L, Devesa-Rey R, Cruz J M and Moldes A B (2015) Optimization of extraction conditions and fatty acid characterization of *Lactobacillus pentosus* cell-bound biosurfactant/bioemulsifier. Journal of the Science of Food and Agriculture 95(2):313-320.
5. Vecino X, Barbosa-Pereira L, Devesa-Rey R, Cruz J M and Moldes A B (2015) Optimization of liquid-liquid extraction of biosurfactants from corn steep liquor. Bioprocess and Biosystems Engineering 38(9):1629-1637.

Biography

Rodríguez-López L is a PhD student at the University of Vigo. She has completed her Master's degree in Advanced Biotechnology in 2016, at University of Vigo. She has co-authored six articles in JCR journals. Moreover, she has collaborated for three months in the Department of Pharmacy at University of Huddersfield, United Kingdom.

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