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Statistical approach to optimize production of lipopeptide biosurfactant by Pseudomonas fluorescens DSS73

Several microorganisms are known to produce a wide variety of surface-active substances referred as biosurfactants. Most biosurfactants are obtained using costly culture media and purification processes, which limits their wider industrial use. The utilization of waste as a feedstock for production of value-added bioproducts has opened new avenues contributing to environmental sustainability. The main objective of this study is to optimize biosurfactant production by *Pseudomonas fluorescens* DSS73 with statistical approaches. Lipopeptide biosurfactant production from *P. fluorescens* DSS73 was carried out with different carbon sources, and maximum yield was achieved with waste glycerol, a raw material obtained from crude biodiesel production. The important medium components identified by the Plackett–Burman method were waste glycerol and urea along with culture parameter, cultivation time. Box–Behnken response surface methodology was applied to optimize biosurfactant production. The maximum estimated value of product yield on biomass growth (Yp/x) was 0.78 g/g. The obtained lipopeptide biosurfactant is able to reduce the surface tension of water up to 27 mN/m.

The obtained experimental results concludes that Box–Behnken designs are very effective statistical tools to improve biosurfactant production. These results may be useful to develop a high efficient production process of biosurfactant. In addition, this type of kinetic modeling approach may constitute a useful tool to design and scaling-up of bioreactors for the production of biosurfactant.

References

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