

Rhamnolipid biosurfactant: Recovery, characterization and evaluation of its effect on antibiotic delivery from a physical hydrogel

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Background and Aims: Rhamnolipids belong to the glycolipid class of biosurfactants and have been first isolated from *Pseudomonas aeruginosa*. They have gained importance in the fields of oil recovery, bioremediation, food and pharmaceuticals owing to their unique properties such as higher biodegradability and lower toxicity. The aim of this study was recovery and characterization of rhamnolipids and evaluation of its effect on antibiotic delivery rate from a physical hydrogel prepared by chitosan and opened ring polyvinyl pyrrolidone (OR-PVP) which can be applied as a wound dressing.

Methods: *Pseudomonas aeruginosa* M34 (a mutant strain) was used for production of rhamnolipids. The adsorption-desorption process used for recovery of rhamnolipids. Purity of achieved rhamnolipids was demonstrated by instrumental method such as IR and NMR. The surface tension of aqueous solutions containing various concentration of rhamnolipid or tween 80 was evaluated and the critical micelle concentration (CMC) of rhamnolipids and tween 80 was determined. Different amount of rhamnolipids and tween 80 was added to hydrogel containing clindamycin and rifampin and the release properties were studied.

Results: The recovered biosurfactants showed improved surface-active property and Results confirmed the higher surface activity of rhamnolipids compared with Tween 80.

Conclusions: Adsorption-desorption can be introduced as an economical method in price and time that could be used for recovery of biosurfactants in large scale. Rhamnolipid was effective on antibiotic delivery rate from physical hydrogel and its antibacterial activity. The electrical charge of components and free water ratio of hydrogel had a crucial rule on activities of surface active agents.

Keywords: Rhamnolipids; Adsorption-desorption; Hydrogel; Surface tension