

MICROBIOLOGY

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Visualization and assessing the effectiveness of biosurfactant derived from *L. acidophilus* as biofilm impeder through microfluidic approaches

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Biomedical devices and implants are amenable to developing microbial biofilms in corresponding environmentally pertinent circumstances. The current challenging situation is to investigate the *in vitro* conditions for the prospective of medically valuable biosurfactants (BSs). The objective of our research was to build up a microfluidic system to evaluate quantitatively the effectiveness of biosurfactant (BS) against biofilm formers. Two types of BS, namely cell free (CF) and cell associated (CA) were isolated from *Lactobacillus acidophilus* NCIM 2903 in a simple fermentation medium (FM) of composition (g/L) of Peptone: Yeast extract: Beef extract: Tri-sodium citrate (10:10:10:5) at pH of 6.5/180 rpm. In addition to reduction in SFT (55 to 28 mN/m), change in pH (from 6.5 to 8.7) of FM after 72 hours was also an indicator for BS production. CFBS and CABS effectively exhibited all characteristics (SFT, interfacial tension, contact angle, emulsification, stability at different pH and temperature) proving its impact as surfactant. Wetting and spreading efficacies offer outstanding opportunities to blend BS for several applications. Analytical characterization of BS disclosed the chemical nature as glycolipid (CFBS) and glycolipoprotein (CABS). The CFBS inhibited biofilm formation on contact lenses and urinary catheter. We used microfluidics based model to ensure the ability of BS to restrict the adhesion of persistent pathogens. Current research aims to develop using BSs as antimicrobial, anti-biofilm and anti-adhesive agents in the biomedical application sector. Our research highlights the expediency of the microfluidic system to observe BSs impeding effects on dominating microbial biofilms.

Biography

Surekha K Satpute has completed her PhD from Savitribai Phule Pune University, Maharashtra, India. She is working as a Woman Scientist, financially supported by Department of Science and Technology (DST), Government of India. She has published 15 research articles in reputed journals. Previously she has worked on low molecular weight biosurfactants from marine bacteria and mutagenicity and anti-mutagenicity of areca nut extract to *Salmonella Typhimurium* TA102. She was the recipient of Junior and Senior Research Fellow Award (2003-2008) from University Grant Commission (UGC), Government of India.

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