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Action of Tween 80 as a Biochemical Agent on Biofilms

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DESCRIPTION

In general, non-ionic and zwitterion detergents are used to solubilize membrane proteins where it is essential to maintain protein function and/or retain native protein-protein interactions for enzyme assays or immunoassays. These detergents are milder and less likely to denaturate than ionic detergents. For these purposes, the Triton-X series of non-ionic detergents and the zwitterion detergent CHAPS are frequently utilized. Ionic detergents, on the other hand, are powerful solubilizers that have a tendency to denature proteins, destroying their activity and function. The kind of sample also affects which detergent is used for cell lysis. Non-ionic emulsifier Tween 80 is frequently added to foods, pharmaceuticals, and cosmetics. We must comprehend how it affects bacteria on our skin, in our gut, and in food products due to its widespread use. This study aims to find out how Tween 80 affects the growth and antimicrobial susceptibility of *Staphylococcus aureus, Listeria monocytogenes,* and *Pseudomonas fluorescens*, common food spoilage and illness-causing bacteria. When *Staphylococcus aureus* was grown as biofilms, the total biomass and planktonic *S. aureus* batch cultures were both increased when 0.1% Tween 80 was added to the growth media. Tween 80, on the other hand, had no effect on batch cultures of *L. monocytogenes*, slowed *P. Fluorescens* growth, and led to less biofilm formation by both *L. monocytogenes* and *P. fluorescens*. Additionally, the antibacterial activity of two hydrophobic antibiotics was diminished by Tween 80 isoeugenol, an essential oil, and rifampicin. When studying the efficacy of hydrophobic antimicrobials that are dispersed in solution by emulsification or when antimicrobials are applied in food matrixes that include emulsifiers, our findings highlight the significance of documenting the indirect effects of emulsifiers. Additionally, the effects of emulsifiers on the human microbiome should be investigated to uncover potential health effects, as the species-specific effects on microbial growth suggest that Tween 80 in cosmetics and food products could alter the composition of the skin and gut microbiota. Numerous biochemical applications have utilized Tween 80, including emulsifying and dispersing substances in food and pharmaceutical products, growing *tubercule bacilli*, isolating nuclei from cultured cells, and solubilizing proteins. It has very little, if any, antibacterial activity. It has been demonstrated to interfere with the antibacterial properties of methyl paraben and its derivatives. Due to the presence or absence of a cell wall, animal, bacterial, and yeast all have different requirements for optimal lysis. Animal tissues require both detergent and mechanical lysis due to their dense and intricate nature. The buffer, pH, salt concentration, and temperature are also important considerations for optimal cell lysis. These are in addition to the detergent selection. The detergent's suitability for use in subsequent processes should be taken into consideration. A dialyzable detergent ought to be chosen if the detergent used for lysis needs to be removed. The most typical surfactant micelle is tween 80. The aqueous phase is influenced by this surfactant. The particle size of Tween 80 found to be significantly larger in the aqueous phase than in the organic phase when it was dissolved. According to some theories, the transition of hydrophilic surfactant from the oil phase into the aqueous phase may play a significant role in the formation of nanoemulsions.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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