

## Evaluation of nonionic surfactants penetration enhancing activity on the absorption of amikacin by liposomal membrane model

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**Background and Aims:** Liposomes are used widely as a biological membrane model, especially for studying the mechanism of drug transport through biological membranes. Among different penetration enhancers in pharmaceutical formulations, non-ionic surfactants such as Poly sorbates have been used widely because of their safety and efficacy. In this study, penetration enhancing effects of these surfactants was investigated by using liposomal membrane model.

**Methods:** The liposomes were prepared with equal proportions of lecithin and cholesterol. The amikacin, an aminoglycoside which is not absorbed orally was used as model drug. Effect of different concentrations of polysorbate 20, 40, 60 and 80 on transporting of amikacin across membrane model was assessed. Amikacin concentration was measured with complex metric method using pigment Tetra Cyano Ethylene (TCNE) in UV wavelength 330 nm.

**Results:** In this study, it was observed that the absorption increases with increasing concentration of enhancers and this effect was better with polysorbate 80 and minimum effect was seen by Polysorbate 20. It was determined that at concentrations above the Critical Micelle Concentration (CMC) the synergistic effect of all surfactants were not better in comparison with lower CMC concentrations.

**Conclusions:** The results of this study show that because of side effects of the surfactants in concentrations above CMC, the best results of the synergistic effects are achieved with concentrations less than CMC.

**Keywords:** Penetration enhancer; Nonionic surfactant; Polysorbate; Liposome; Amikacin.