**Abstract**

Liposomes used as drug carriers of quinine, an antimalarial drug, were synthesized by a thin-film hydration method followed by sonication. The factors that could affect the loading efficiency measured by fluorescence spectroscopy were analyzed. The two techniques – passive loading and active loading - used to load the drug were tested. The average loading efficiencies of liposome sample of 1,2-ditetradecanoyl-sn-glycero-3-phosphocholine (DMPC) and cholesterol (in 55:45 mole ratio) incubated at room temperature for a wide range of drug to lipid ratios by weight (1:3, 1:5, 1:10, 1:20, and 1:30) were 2% and 37% via passive loading and active loading, respectively.

For the active loading of quinine into liposomes, the different phase transition temperature lipid did not result in significant difference in loading efficiency. But the presence of cholesterol greatly improved the loading efficiency. The change of polar head group from zwitterionic choline to anionic glycerol did not improve the loading efficiency. Increasing the drug to lipid ratio resulted in decreasing loading efficiency as expected because the loading efficiency was calculated based on the initial input of drug. The incubation temperature during the active loading of the drug did not affect the loading efficiency for liposomes with cholesterol, while the incubation temperature did cause the loading efficiency to drop when the liposome without cholesterol was incubated at temperatures above the phase transition temperature. It was determined that a pH of 4 was the optimum pH at which the loading efficiency was the highest. Lastly, It was determined that the highest loading efficiency of 50.9% (average of four different experiments, SD=13%) was achieved with the DMPC:chol (55:45 molar ratio) formulation incubated at room temperature and at drug to lipid ratio of 1:30.