CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Silica surface requires modification of its surface properties because untreated silica was found not to adsorb organic solute in any significant degree directly onto the bare surface. Some of the current research and review papers describe a novel nonionic polymer class, Pluronic L64 block copolymer, a high molecular weight surfactant, to be more efficient for adsolubilization of organic compounds than low-molecular-weight surfactant. Previous attemps to adsorbed organic compounds using high molecular weight surfactant found that Pluronic L64 gave the highest adsorption (0.08 mmol/g of silica)

In this research mixed surfactant systems of Pluronic with conventional surfactant were studied and results indicated that cetyltrimethyl ammonium bromide (CTAB)–Pluronic L64 has higher adsorption. The adsolubilization (3.120 mmol of phenol/ g of silica, 0.254 mmol of 2-Napthol/ g of silica, 0.023 mmol of naphthalene/ g of silica) were higher than the single surfactant system of Pluronic L64 (2.410 mmol of phenol/ g of silica, 0.195 mmol of 2-Napthol/ g of silica, 0.017 mmol of naphthalene/ g of silica). This could be due to a mixed surfactant can be used for enhancing the organic adsolubilization capacity. However, this depends on type of surfactant which is used for mixing with the Pluronic L64. Based on this present study, the results obtained suggest that using the mixed system of the block copolymer with cetyltrimethyl ammonium bromide (CTAB) for the adsolubilzation to adsorb of the organic solutes is better than using the single Pluronic L64 surfactant system. New and important developments are expected for the mixed system. The results suggest that the adsolubilization of phenol may be related to the amount of adsorbed surfactant as the amount of the adsorbed cationic surfactant–triblock copolymer; cetyltrimethyl ammonium bromide (CTAB)–Pluronic L64 (mixture A), is higher than the other systems because of the stronger interaction due to the synergetic effect than the hydrogen bonding between PEO chains and the hydrophilic silica surface sites.

Adsolubilization is strongly influenced by the amount of adsorbed surfactant, type of surfactant, ionic strength, and concentration. Besides the surfactant system, the properties of the organic solutes, such as polarity and size of molecule, also can affect the adsolubilization. The higher polarity, the greater organic solute was adsolubilized into the surfactant. The polar compounds tend to have significantly higher the amounts of adsolubilized organics than the non-polar compounds (Phenol, 2-Naphthaol, naphthalene).

5.2 Recommendations

Based on the present results, the following recommendations are suggested for future studies:

1. Because the critical micelle concentrations (CMC) of the nonionic surfactant decrease very rapidly upon increasing temperature, it is interesting to study the effect of temperature on the mixed surfactant systems using Pluronic L64, which is one type of nonionic surfactant as one of the component.
2. Effect of additives such as NaCl, $BaCl_2$ on Pluronic or the EO/PO block copolymer in aqueous solution should be investigated.
3. Adsolubilization using mix surfactant systems on hydrophobic modified silica particles may increase adsolubilization efficient when compare hydrophobic silica because the hydrophobic nature of the modified silica may increase the adsolubilization which will inturn increase the adsorption of organic compounds.