CHAPTER V
CONCLUSIONS

The ASA-loaded carrageenan hydrogels and the ASA-doped PTh/carrageenan blend films were prepared by varying the crosslinking ratio to study release mechanism characteristics and the diffusion coefficient of the drug with and without electric field. The swelling ability and the mesh size of each carrageenan hydrogel were characterized. The degree of swelling and the mesh size decrease with increasing crosslinking ratio. The diffusion coefficients were determined with respect to the effects of crosslinking ratio, type of crosslinking agent, and electric field strength. For the effect of crosslinking ratio, the diffusion coefficients of the drug from the carrageenan hydrogels and PTh/carrageenan blend film increase with decreasing crosslinking ratio due to the larger mesh size. For the effect of crosslinking agent type, the diffusion coefficients of the drug from the carrageenan hydrogel and PTh/carrageenan blend films decrease with decreasing the crosslinking agent ion size ($Ba^{+} > Ca^{2+} > Mg^{2+}$) at the same crosslinking ratio. Under applied electric field, the diffusion coefficient of the drug from the carrageenan hydrogel is higher than that without electric field due to the electrostatic interaction between the negatively charged drug and the negatively charged electrode (under cathode) and the enhanced hydrogel mesh size. Moreover, the diffusion coefficients of the drug from the PTh/carrageenan blend films are greater than the diffusion coefficients of the drug from the carrageenan hydrogel, the presence of a conductive polymer can enhance the drug delivery rate considerably.