CHAPTER IV

CONCLUSIONS

Extended release formulations of propranolol HCl were developed based on osmotic technology. Gelatin capsule was selected because gelatin capsule dissolved faster than HPMC capsule. Gelatin capsule containing drug and osmotic agent was coated with cellulose acetate solution plasticized with PEG400 was studied The effect of different formulation variables was studied to optimize release profile.

1. Orifice size effected on drug release that an increase in the orifice size resulted in an increase in release rate.

2. The cellulose acetate film was smoother while concentration of PEG400 was increased. SEM photomicrographs shows pore in the cellulose acetate film of coated capsule when contacted with water. It exhibited that PEG400 leached out from the membrane due to hydrophilic property. The continuous cavity occurred when concentration of PEG400 was increased up to 100%. Surface section topographys shows that number of pore was increased when PEG400 was increased. The result of SEM photomicrograph is in accordance with the result of drug release that drug release increased as concentration of PEG400 was increased.

3. The drug release rate decreased considerably with an increase in thickness of cellulose acetate membrane from 31.5550 to 81.7217 μm., whereas, the drug release rate did not change when the CA thickness level was increased from 81.7217 to 110.0008 μm. An increase in membrane resistance to water diffusion when membrane thickness level was increased caused a decreased drug release rate.

4. Coated capsule containing different amount of osmotic agent provided slight difference of drug release rate. The release of drug increased as the concentration of NaCl added to propranolol HCl capsule formulations increased. However, capsule containing pure lactose provide highest drug release. Aggregation of gelatin shell when interact with NaCl resulted in low drug release

5. Number of orifice influenced on drug release. When number of orifice was increased, the drug release rate increased. Orifice position influenced on variation of drug release. Variation of drug release from coated capsule with the orifice at the side of capsule was higher than those with the orifice at the end of capsule.

6. A decrease in the rate of release resulted from increasing the osmotic pressure in the dissolution medium. Decreasing osmotic pressure difference across the membrane might be a cause of slower drug release rate.

7. pH of dissolution medium effected on drug release that the drug release was higher in phosphate buffer pH 1.2 than in phosphate buffer pH 6.8 because solubility of propranolol HCl was higher in buffer solution pH 1.2 than in buffer solution pH 6.8.

8. Interaction between osmotic agent and gelatin was observed. The higher ionic strength of osmotic agent(NaCl and KCl) might interact with dissolved gelatin shell resulting in aggregation of gelatin. Subsequently, the water influx through CA membrane to dissolve the drug and osmotic agent was obstructed by the lump of gelatin resulting in the low drug release. Thus, the coated capsule containing high ionic stength of osmotic agent provided the low drug release.