With insulin-loaded nanoparticles preparation, glucose levels of normal rats were measured after intestinal perfusion and compared with effect of subcutaneous insulin. Approximately 70% of blood glucose level was reduced over 45-55 min and the perfusion of placebo with subcutaneous insulin that used as reference group shows almost the same trend in the decline of glucose level (Figure 3.15).

In the case of diabetic rats as shown in (Figure 3.16), hypoglycemic effect after insulin-loaded nanoparticles formula perfusion was larger than the effect after placebo perfusion with insulin subcutaneous injection. All points at 55 min and after are significant ($p < 0.05$).

Comparison of glucose concentration in normal and diabetic rats can be obtained from in situ perfusion of oral insulin-loaded formula in (Figure 3.17). Significant glucose level reduction after oral formula perfusion in normal rats was obtained from 15 min to 55 min ($p < 0.05$). Moreover, (Figure 3.18) represents the comparison of insulin subcutaneously effect between diabetic and non-diabetic rats. While the significant reduction in glucose level in normal rats was showed at 30 min to 60 min ($p < 0.05$).

The insulin-loaded nanoparticle formulation was more effective in increasing the intestinal absorption of insulin in normal rats and the hypoglycemic effect of oral formula was significantly greater than standard insulin solution especially at 55 min to 90 min ($p < 0.05$) (Figure 3.19). Steady-state glucose concentrations in diabetic rats can be observed from in situ perfusion of Rh-insulin solution, while the most significant hypoglycemic effect was observed after insulin-loaded nanoparticles preparation perfusion in 45 min to 90 min ($p < 0.05$) (Figure 3.20).