The degradation of organic substances and biogas production was high in anaerobic digestion of pineapple peel operated at 37 °C. One of the dominant bacteria in mesophilic digester of pineapple peel was Bacillus macerans. This isolated culture can degrade glucose, xylose and xylan. The development of mathematical model for describe the kinetic of anaerobic glucose degradation was aimed of this study. The experiments were carried out in 120 ml vial. The mathematical model was developed base on Monod equation. This model was modified by additive the inhibition factor of substrate (glucose) concentration, pH and the selected product concentration. The glucose concentration of 4, 5, 8, 12 and 20 g/l were varied. The glucose uptake rates, concentration of intermediate products were measured.

The results of substrate concentration show that the glucose uptake depended on the initial glucose concentration. However, substrate inhibition was found when the initial concentration of glucose more than 8 g/l. The maximum glucose utilized is 1.46 g/l-hr and the kinetics constant \( K_s \) and \( \mu_{\text{max}} \) are 500 g/l and 347.2 day\(^{-1}\), respectively.