The reduction current of $\text{H}_2\text{O}_2$ which was generated by enzymatic reaction of glucose was measured at a microparticle-loaded polypyrrole film when glucose oxidase was in the solution or when it was immobilized in the film. This technique has the advantage of enabling detection at a low potential (0.0 V versus SCE). The current was measured at various thicknesses of the film, various concentrations of glucose and various potentials. The results were analyzed by use of previously derived diffusion-kinetic equations, it was found that the electrochemical reduction of $\text{H}_2\text{O}_2$ was the rate-determining step and that the reaction occurred at the interface between the film and the solution.