

DEVELOPMENT OF NEW TECHNOLOGY ON HYDROGEN PEROXIDE REMOVAL USING CATALASE IMMOBILIZED BY POLYELECTROLYTE COMPLEX

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Hydrogen peroxide used in technologies like sterilization, bleaching and metal polish has recently replaced the bleach of a chlorine system from the problem of an abandonment residual substance. In a food industry, in order to prevent multiplication of the various germs generated when processing of fish, shellfishes and dairy products is performed, sterilization by hydrogen peroxide performed beforehand. Moreover, hydrogen peroxide is contained also in the waste fluid after performing metal surface processing at factories of paper, pulp, and fiber. Hydrogen peroxide will damage to an ecosystem since it is a strong oxidizer. Therefore, the processing which disassembles hydrogen peroxide to harmless water and harmless oxygen is required.

In this study, catalase is immobilized in the polyelectrolyte complex formed by using chitosan and alginic acid as the immobilizing agents. The influence of temperature, concentration, and pH on the heat stability and the enzyme reaction of the immobilized catalase are investigated. By immobilizing enzyme in a polyelectrolyte complex, the structure of enzyme becomes stable compared with free enzyme. Therefore, it was hard to receive the influence of the heat by which inactivation of catalase was mostly caused. About heat stability, inactivation of enzyme was improved to 70 degrees or more compared to the free one. About pH stability, the decrease in the reaction velocity by acid side was controlled by the interaction of polyelectrolyte complex and catalase like heat stability.